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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/582,546	DORFMUELLER ET AL.	
	Examiner	Art Unit	
	THOMAS F. VALONE	2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/2/10*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9-11 and 13-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-11,13,14,16 and 17* is/are rejected.

7)☒ Claim(s) *15* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 13, 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding the amended claim 13, the term “cross-section” lacks antecedent basis in the specification since it does not appear anywhere in the original disclosure filed with the application. Furthermore, since the drawings show only a flat, two-dimensional perspective, with no information in the specification to the contrary, the amended term “cross-section” is inconsistent with “thickness” and instead seems to claim a cross-sectional area that is parallel with the electrodes as shown. The term "measuring area 12” (Fig. 1, 2 and instant disclosure, p. 5, line 11) is the closest term that is an area similar to the claimed “cross-section" but appears to be an area that is parallel to the electrodes and not perpendicular to it. The term “cross-section” is therefore required to be deleted.

Regarding the amended claim 14, the newly introduced terms “protrude”, "remainder” and “respective” have no antecedent basis in the specification and therefore constitute new matter. It is suggested that the entire phrase “structures protrude from a remainder of their respective side…formed by regularly arranged geometric shapes” be deleted and instead, - - regularly arranged geometrically shaped - - should be inserted before “structures along sides…” in line 3.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" or “wherein” and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte*

Steigewald, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, claim 14 recites the broad recitation of the finger electrodes “have structures along sides of the finger electrodes" in line 3, and the claim also recites “structures protrude from a remainder of their respective side…formed by regularly arranged geometric shapes” in lines 5, 6, which is the narrower statement of the range/limitation. It also indefinite since it is not clear what the terms "remainder” or “respective” actually refers to, in light of the specification. It is suggested that the entire phrase “structures protrude from a remainder of their respective side…formed by regularly arranged geometric shapes” be deleted and instead, - - regularly arranged geometrically shaped - - should be inserted before “structures along sides…” in line 3.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 9-11, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Berger (WO 2004/097392) in view of Ishida (4,916,384) of record.

Regarding claims 9-11, 17, (Berger’s US equivalent 2007/0158191 application of record paragraph numbers are cited for translation clarity) Berger teaches a sensor for

determining the concentration of particles in gases (US equivalent, par. 1) having at least one substrate element and a measuring area between the first and second electrodes (14, US equivalent, par. 33 and Fig. 1-4) with a voltage applied between the electrodes (Fig. 6, 7 and AC signals, US equivalent, par. 42). Berger teaches the first and second electrodes forming an interdigital comb structure (US equivalent, par. 2, 15, 33 and Fig. 1) where at least one measuring electrode has finger electrodes with varying widths (US equivalent, par. 15, Fig. 1-4). Berger further teaches varying widths as claimed, by explaining that the width or area of the comb electrodes can vary "at most" up to one-tenth of the distance between the electrodes (US equivalent, par. 15 and 35) as in claim 9.

Berger does not explicitly teach an asymmetric electric field being formed on the measuring area where the electrodes are not parallel to each other and the distance between them increases or decreases along the length of the electrode.

Ishida, from the same field of endeavor, teaches an asymmetric electric field in the measuring area (13, col. 4, line 3-10), for measuring soot particles (col. 1, line 57 and col. 4, line 1-15) as in claim 17, where the electrodes are not parallel to each other and the distance between them increases or decreases along the length of the electrode (Fig. 4), as in claims 9-11. Ishida further teaches one measuring electrode (13, Fig. 4) along the side facing the other measuring electrode (12, Fig. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included an asymmetric electric field where the electrodes are not parallel to each other and the distance between them increases or decreases

along the length of the electrode, with a structure along the side facing the other measuring electrode as taught by Ishida, in the Berger measuring area by modifying the electrode design, for the benefit of determining the volumetric concentration of soot particles in the measuring area considering conductivity and flow rate, as suggested by Ishida (col. 3, line 50-55 and line 65-67).

7. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berger as modified by Ishida (B-I) as applied to claims 9-12, 17 above, and further in view of Becker (5,858,192).

Regarding claim 13, the teachings of B-I are reviewed above. B-I further teaches a measuring electrode that has a raised pattern along the finger electrodes (Berger, 12 or 13) with a clearly discernible cross section (Berger, Fig. 2-4) with a side view as normally required to show a cross section, to one of ordinary skill in the art, as in the amended claim 13.

B-I does not teach measuring or finger electrodes with a triangular form or regularly arranged geometric shapes.

Becker, from the same field of endeavor, teaches measuring and a group of electrodes with a triangular form (col. 5, line 45-50 and col. 4, line 11), which is a geometric shape regularly arranged.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a measuring or finger electrodes with a triangular geometric form regularly arranged in the B-I sensor as taught by Becker, for the benefit

of creating a spatially inhomogeneous electric field distribution, as suggested by Becker (col. 5, line 55-60).

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Berger as modified by Ishida (B-I) as applied to claims 9-12, 14, 17 above, and further in view of Bosch (6,634,210) of record.

Regarding claim 16, the teachings of B-I are reviewed above.

B-I does not teach a central electrode between the first and second measuring electrode.

Bosch, from the same field of endeavor, teaches a central electrode (guard electrode, col. 7, line 60-65) between the first and second measuring electrode (18, 19, col. 9, line 20-25 and Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a central electrode in the B-I sensor between the first and second measuring electrode, as taught by Bosch, for the benefit of providing a separate ground connection, as suggested by Bosch (col. 7, line 25-30).

Allowable Subject Matter

9. Claims 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 1st and 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Acknowledgement is given for the amendment to the claims. As a result, the objection to the drawings and part of the rejection under 35 USC 112 (referring to claims 14, 15) have been withdrawn.

12. Applicant's arguments filed 4/2/10 have been fully considered but they are not persuasive.

13. Regarding the argument concerning the rejection of claim 13 for the newly introduced claim limitation of “cross-section” it is not clear which cross-section is being claimed. Since the applicant is arguing “they must have thickness as well, even if not depicted” (Remarks, 4/2/10, p. 4) and “the sensor of claim 13 is a three-dimensional device, a thickness” (Remarks, 4/2/10, p. 5), it seems that the limitation claims a thickness cross-section. However, since the adjective “triangular” is modifying the limitation in claim 13, it seems that alternatively, the applicant is attempting to claim an area cross-section as seen from above the electrode but it is not clear without any antecedent description of this portion of the invention in the instant specification that was filed with the application. The term “cross-section" appears to be hindsight and therefore, new matter. It is suggested that the term “shape” could be substituted for the new matter instead.

14. Regarding the argument concerning the boldfaced, underlined, italicized “***space***” (Remarks, 4/2/10, p. 5) between the measuring electrodes used as a measuring area, this seems to be unrelated to the argued “cross-section” of the electrodes.

15. Regarding the paragraph of italicized, underlined and bold-faced argument (Remarks, 4/2/10, p. 5) this seems to apply to the amended claim limitations of claim 14 and is therefore moot.

16. Regarding the argument concerning "varying widths" of claim 9 (Remarks, 4/2/10, p. 6), Berger teaches varying widths as claimed, by explaining that the width or area of the comb electrodes can vary "at most" up to one-tenth of the distance between the electrodes (US equivalent, par. 15 and 35) as in claim 9. Furthermore, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Regarding the argument concerning the amended claim 14, it is moot in view of the present Office Action.

It is suggested that the entire phrase "structures protrude from a remainder of their respective side…formed by regularly arranged geometric shapes" be deleted and instead, - - regularly arranged geometrically shaped - - should be inserted before "structures along sides…" in line 3 of claim 14 in order to overcome the rejections under 35 USC 112.

It is suggested that if the applicant were to introduce language into the claims that has antecedent basis and is clearly found in the instant specification, e.g., "structured finger electrodes", where the "structured" term is claimed and thereby

defined as being formed by regularly arranged tips, squares, dots or other geometric shapes (instant specification, p. 6, line 25-31), the application may receive a more favorable review.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Berger and Schmidt teach interdigital comb electrodes.

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS F. VALONE whose telephone number is (571)272-8896. The examiner can normally be reached on Tu-W-Th, 10:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas F Valone/
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